Vanadium flow battery and perovskite battery

Can a vanadium redox flow battery be a high-performance battery?

Vanadium redox flow battery (VRFB) has garnered significant attention due to its potential for facilitating the cost-effective utilization of renewable energy and large-scale power storage. However,the limited electrochemical activity of the electrode in vanadium redox reactions poses a challengein achieving a high-performance VRFB.

Can LA-based perovskite be used as a catalyst for vanadium redox reactions?

Herein,we successfully fabricated La-based perovskite of LaBO 3 (B = V,Cr,Mn,Fe,Co) as catalystof graphite felt (GF) electrode for vanadium redox reactions (Fig. 1) and uncovered their underlying catalytic mechanisms. For perovskites,oxygen-containing functional groups are formed at B-O binding to boost the adsorption of vanadium ions.

What is the intrinsic catalysis of perovskites for vanadium redox reactions?

The intrinsic catalysis of perovskites for vanadium redox reactions is in increasing order of LaVO 3 < LaCrO 3 < LaMnO 3.

Why do perovskites adsorb vanadium ions?

For perovskites,oxygen-containing functional groups are formed at B-O bindingto boost the adsorption of vanadium ions. In addition,perovskite has a stable structure and accommodates multi-valence B-site ions and structure defect,which effectively promotes the electron transfer of vanadium redox reactions.

Abstract Vanadium redox flow batteries (VRFBs) have emerged as a promising contenders in the field of electrochemical energy storage primarily due to their excellent energy storage capacity, scalability, ...

Due to the inadequate electrochemical properties of the original graphite felt (GF), catalysts are needed to improve the performance of vanadium redox flow batteries (VRFBs). Introducing structural defects ...

This study is critical for promoting fundamental understanding and offering a design strategy for achieving superior-performance metal-based electrocatalysts in VRFB. KEYWORDS ...

The catalysis is primarily attributed to activity of B-O bindings and perovskite structure that effectively promote the adsorption of vanadium ions. Moreover, perovskite contributes more active ...

Abstract Developing efficient cathode catalysts is pivotal for advancing vanadium redox flow batteries (VRFBs). This study compares hydrothermal (H-NdFeO 3 @GF) and sol-gel (SG ...

Various metal oxide catalysts have been utilized to enhance the electrode reaction kinetics in vanadium redox flow battery (VRFB). However, the determining factor governing their catalysis is ...

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